Web Atlas of Wild Bird Pathology:Unique Tool to Diagnose Disease in Wild Birds and Identify Avian Threats to Public Health

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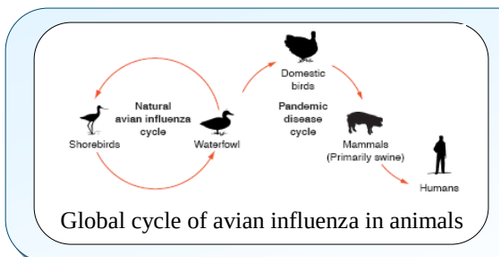
osprey

Statement of Issue

Spread of avian disease to humans is a threat to public health. The current global spread of the highly pathogenic strain of avian H5N1 influenza virus has raised fears of a global pandemic. The life cycles of avian influenza viruses are complex.



Global cycle of avian influenza in animals

Field Manual of Wildlife Disease: General Field Procedures and Diseases of Birds.

www.nwhc.gov/pulications/field_manual/chapter_22.pdf

The possibility of a pandemic may become reality only if there is a mutation allowing human to human transmission. Though most public attention is currently focused on influenza, birds are reservoirs of many other pathogens causing emerging disease in humans. West Nile Virus was identified in the US for the first time in 1999. The disease was in wild birds and has now spread throughout all of North, Central, and South America killing birds, humans, and many other species. In addition to emerging or re-emerging diseases, birds are reservoirs of many known human pathogens, including eastern equine encephalitis, lyme disease, and salmonellosis.

Need: To assess the public health threat of avian diseases and provide accurate ecological risk assessments for wild bird health, it is necessary to understand the causal agents and mechanisms of infectious and anthropogenic diseases.

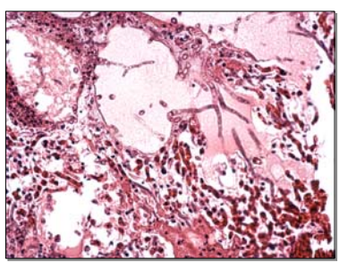
Objectives: Produce and maintain web-based atlas for histology and pathology of wild birds on public Web site. Work with collaborators to make site as comprehensive and accurate as possible. Provide teaching/reference tool for others working with wild birds.

Project: Provide a scientific resource to facilitate accurate diagnosis of disease in birds, facilitate the assessment of temporal and spatial trends of disease occurrence, and identify disease threats to human health. Federal and state agencies, academic institutions and non-governmental organizations have partnered to share data for the basis of this Atlas. Scientists from these institutions are collaborating to standardize terminology to describe lesions and diagnostic criteria**.**

Methods: An Oracle® database was created to manage the data pertaining to individual cases. The types of data include case histories, radiographs, and images of macroscopic and microscopic normal anatomy and pathologic change. The database and website can be searched by species, location, date, morphological diagnosis, causative agent, potential for transmission to humans and other single or mixed criteria. Links to pertinent literature citations are provided. EPA and our partners are making the Wild Bird Pathology Atlas available to the global scientific community on the EPA.gov public Web site.

Catalog can be searched by any combination of the query fields below:

Animal ID:	State:
Species:	Year:
Tissue: lung	Zoonotic threat: y
Morphologic DX: aspergillosis	Radiograph: y
Etiologic DX:	Macroscopic image: y
Contributor:	Microscopic: y



Animal ID: 16707-004 Zoonotic threat: y

Species: Canada goose State/year: NE/2000

Tissue: lung

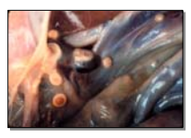
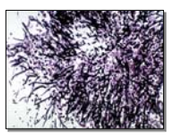
Contributor: Lou Sileo, NWHC*

Morphological Description: Marked inter-lobular edema. Most atria are occluded by sero-fibrinous exudate that contains branching hyphae. Extensive areas of necrosis, both massive and focal centered on atrial caps. Pleural exudate and extensive necrosis around arcades which contain hyphae.

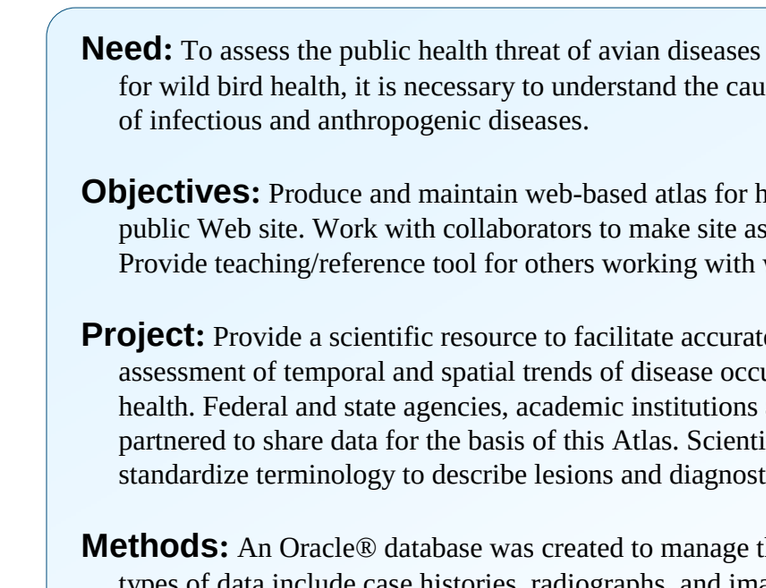
Morphologic DX: Pneumonia, severe, acute, parabronchial, necrotizing, mycotic.

Etiologic DX: Aspergillosis, *A. funigatus*

Images related to aspergillosis

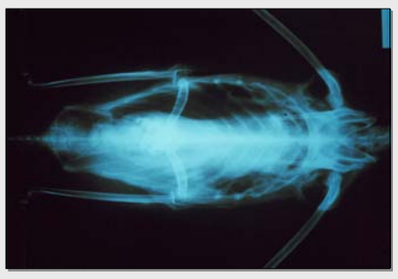




* USGS National Wildlife Health Center, Madison, WI



Microscopic image, H&E stain
Tissue: lung

Interlobular edema: IE
Sero-fibrinous exudate: SE
Branching fungal hyphae: FH
Necrosis: NE, ◯ circle



X-ray: consolidated lungs, pneumonia

Gross photo: round, raised lesions on serosa characteristic of aspergillosis

Microscopic image with silver stain to highlight fungal hyphae

Next steps

- Atlas prototype will go on EPA.gov public site on a password protected basis
- Experts in field will beta test and review the atlas
- With agreement and appropriate QA procedures in place, site will go public.
- Living atlas- intention is for it to grow with new cases indefinitely

Product

- Wild Bird Pathology Atlas will be available to the global scientific and educational communities
- Ready access to this information will facilitate rapid and accurate identification of diseases in wild birds
- Early diagnosis will allow timely and effective protective measures for both animals and humans

USGS science for a changing world

TUFTS Center for Conservation Medicine

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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